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**Substitute for form 1449A/PTO**

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

*(use as many sheets as necessary)*

Sheet	1	of	4
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**Complete if Known**

Application Number	09/678,366
Filing Date	10/03/2000
First Named Inventor	Ming Xi
Group Art Unit	1762 2827
Examiner Name	Unassigned ZARNKE
Attorney Docket Number	4714P1/AMI-11

## U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code <sup>2</sup> (if known)			
<i>OK</i>	AJ	4,058,430		Suntola et al.	11-15-1977	
<i>OK</i>	AK	4,389,973		Suntola et al.	06-28-1983	
<i>OK</i>	AL	4,413,022		Suntola et al.	11-01-1983	
<i>OK</i>	AM	4,767,494		Kobayashi et al.	08-30-1988	
<i>OK</i>	AN	4,806,321		Nishizawa et al.	02-21-1989	
<i>OK</i>	AO	4,840,921		Matsumoto	06-20-1989	
<i>OK</i>	AP	4,845,049		Sunakawa	07-04-1989	
<i>OK</i>	AQ	4,859,627		Sunakawa	08-22-1989	
<i>OK</i>	AR	4,861,417		Mochizuki et al.	08-29-1989	
<i>OK</i>	AS	4,876,218		Pessa et al.	10-24-1989	
<i>OK</i>	AT	4,993,357		Scholz	02-19-1991	
<i>OK</i>	AU	5,082,798		Arimoto	01-21-1992	
<i>OK</i>	AV	5,130,269		Kitahara et al.	07-14-1992	
<i>OK</i>	AW	5,166,092		Mochizuki et al.	11-24-1992	
<i>OK</i>	AX	5,225,366		Yoder	07-06-1993	
<i>OK</i>	AY	5,250,148		Nishizawa et al.	10-05-1993	
<i>OK</i>	AZ	5,256,244		Ackerman	10-26-1993	
<i>OK</i>	BA	5,270,247		Sakuma et al.	12-14-1993	
<i>OK</i>	BB	5,278,435		Van Hove et al.	01-11-1994	
<i>OK</i>	BC	5,281,274		Yoder	01-25-1994	

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## FOREIGN PATENT DOCUMENTS

[illegible]

**Examiner  
Signature**

Date  
Considered

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<sup>1</sup>Unique citation designation number. <sup>2</sup>See attached Kinds of U.S. Patent Documents. <sup>3</sup>Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup>For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup>Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 II possible. <sup>6</sup>Applicant is to place a check mark here if English language Translation is attached.

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Substitute for form 1449B/PTO		<b>Complete if Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)  Sheet <u>4</u> of <u>4</u>		Application Number	09/678,266
		Filing Date	10/03/2000
		First Named Inventor	Ming Xi
		Group Art Unit	1762 <i>2828</i>
		Examiner Name	Unknown <i>LARNELE</i>
		Attorney Docket Number	4714P1/AMI-11

[illegible]

Examiner Signature	<i>[Signature]</i>	Date Considered	8/6/12
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<sup>1</sup>Unique citation designation number. <sup>2</sup>Applicant is to place a check mark here if English language Translation is attached.

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**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

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Sheet	1	of	2
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**Complete if Known**

<b>Application Number</b>	<b>09/678,266</b>
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<b>Filing Date</b>	10/3/2000
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<b>First Named Inventor</b>	Ming Xi
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Group Art Unit	<del>4702</del> 2823
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Examiner Name	unassigned <b>ZARNEK</b>
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Attorney Docket Number	4714P1/AMI-11
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Examiner Signature	<i>David H. Funch</i>	Date Considered	8/6/2
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Field	Value
Application Number	09/678,266
Filing Date	10/3/2000
First Named Inventor	Ming Xi
Group Art Unit	1702 2823
Examiner Name	unassigned A JARNER
Attorney Docket Number	4714P1/AMI-11

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Examiner Signature	<i>David H. Starnes</i>	Date Considered	<i>8/6/2</i>
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U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)		Docket No. APPM/4714.P1	Serial No. 09/678,266
LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT (Use several sheets if necessary)		Applicant Kori, et al.	Confirmation No. 4642
Examiner Zameke, D.		Filing Date 10/03/2000	Group 2827

## U.S. Patent Documents

*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate
OH	A1	2001/0042799 A1	11/22/2001	Kim, et al.	239	553	02/02/2001
	A2						
	A3						
	A4						
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	A7						
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	A10						
	A11						
	A12						

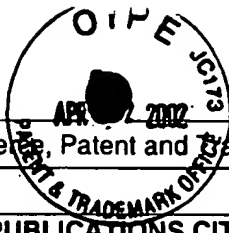
## Foreign Patent Documents

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	B2						<input type="checkbox"/>	<input type="checkbox"/>

## OTHER ART

*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
OH	C1	"Cluster Tools for Fabrication of Advanced Devices" Jap. J of Applied Physics, Extended Abstracts 22 <sup>nd</sup> Conference Solid State Devices and Materials (1990), pp. 849- 852
OH	C2	Kitigawa, et al., "Hydrogen-mediated low temperature epitaxy of Si in plasma-enhanced chemical vapor deposition", Applied Surface Science (2000), pp. 30-34
OH	C3	Lee, et al., "Pulsed nucleation for ultra-high aspect ratio tungsten plugfill", Novellus Systems, Inc. (2001), pp. 1-2 (COPY NOT AVAILABLE TO APPLICANT AT THIS TIME)
Examiner		Date Considered 8/6/2

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U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)		Docket No. AMAT/4714.P1	Serial No. 09/678,266
LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT		Applicant Xi, et al.	
(Use several sheets if necessary)		Filing Date October 03, 2000	Group 1762 2825
Examiner Unknown			

## U.S. Patent Documents

*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate
DA	A1	4,486,487	12/04/84	Skarp	428	216	04/25/1983
DA	A2	4,829,022	05/09/89	Kobayashi et al.	437	107	12/09/1986
DA	A3	4,834,831	05/30/89	Nishizawa et al.	156	611	09/04/1987
DA	A4	4,838,983	06/13/89	Schumaker et al.	156	613	03/18/1988
DA	A5	4,838,993	06/13/89	Aoki et al.	156	643	12/03/1987
DA	A6	4,859,625	08/22/89	Nishizawa et al.	437	81	11/20/1987
DA	A7	4,927,670	05/22/1990	Erbil	427	255.3	06/22/1988
DA	A8	4,931,132	06/05/90	Aspnes et al.	156	601	10/07/1988
DA	A9	4,960,720	10/02/90	Shimbo	437	105	08/24/1987
DA	A10	4,975,252	12/04/90	Nishizawa et al.	422	245	05/26/1989
DA	A11	5,013,683	05/07/91	Petroff et al.	437	110	01/23/1989
DA	A12	5,085,885	02/04/92	Foley et al.	477	38	09/10/1990
DA	A13	5,091,320	02/25/92	Aspnes et al.	437	8	06/15/1990

## Foreign Patent Documents

*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
DA	B1	01/66832 A2	09/13/2001	WO	C30B	16/44		X
DA	B2	01/40541 A1	06/07/2001	WO	C23C	16/40		X
DA	B3	01/36702 A1	05/25/2001	WO	C23C	16/00		X
DA	B4	01/29893 A1	04/26/2001	WO	H01L	21/768		X
DA	B5	01/29891 A1	04/26/2001	WO	H01L	21/768		X

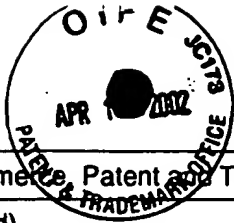
## OTHER ART

*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
DA	C1	Hultman, et al., "Review of the thermal and mechanical stability of TiN-based thin films", <i>Zeitschrift Fur Metallkunde</i> , 90(10) (Oct. 1999), pp. 803-813.
DA	C2	Klaus, et al., "Atomic Layer Deposition of SiO <sub>2</sub> Using Catalyzed and Uncatalyzed Self-Limiting Surface Reactions", <i>Surface Review &amp; Letters</i> , 6(3&4) (1999), pp. 465-448.

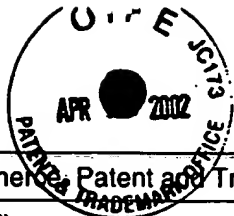
Examiner

Date Considered 8/6/2

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U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)		Docket No. AMAT/4714.P1		Serial No. 09/678,266				
LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT				Applicant Xi, et al.				
(Use several sheets if necessary)				Filing Date October 03, 2000				
Examiner Unknown				Group 1700				
U.S. Patent Documents								
*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date if Appropriate	
DL	A14	5,246,536	09/21/93	Nishizawa et al.	156	610	03/10/1989	
DL	A15	5,254,207	10/19/93	Nishizawa et al.	156	601	11/30/1992	
DL	A16	5,296,403	03/22/94	Nishizawa et al.	437	133	10/23/1992	
DL	A17	5,311,055	05/10/94	Goodman et al.	257	593	11/22/1991	
DL	A18	5,316,615	05/31/94	Copel	117	95	03/09/1993	
DL	A19	5,348,911	09/20/94	Jurgensen et al.	117	91	04/26/1993	
DL	A20	5,374,570	12/20/94	Nasu et al.	437	40	08/19/1993	
DL	A21	5,438,952	08/08/1995	Otsuka	117	84	01/31/1994	
DL	A22	5,439,876	08/08/95	Graf et al.	505	447	08/16/1993	
DL	A23	5,441,703	08/15/95	Jurgensen	422	129	03/29/1994	
DL	A24	5,443,647	08/22/95	Aucoin et al.	118	723 ME	07/11/1994	
DL	A25	5,455,072	10/03/95	Bension et al.	427	255.7	11/18/1992	
DL	A26	5,469,806	11/28/95	Mochizuki et al.	117	97	08/20/1993	
DL	A27	5,503,875	04/02/96	Imai et al.	427	255.3	03/17/1994	
Foreign Patent Documents								
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DL	B6	01/29280-A1	04/26/2001	WO	C23C	16/32		X
DL	B7	01/27347-A1	04/19/2001	WO	C23C	16/44		X
DL	B8	01/27346-A1	04/19/2001	WO	C23C	16/44		X
DL	B9	01/15220-A1	03/01/2001	WO	H01L	21/768		X
OTHER ART								
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.						
DL	C3	Yamaguchi, et al., "Atomic-layer chemical-vapor-deposition of silicon dioxide films with extremely low hydrogen content", Appl. Surf. Sci., Vol. 130-132 (1998), pp. 202-207.						
DL	C4	George et al., "Surface Chemistry for Atomic Layer Growth", J. Phys. Chem., Vol. 100 (1996), pp. 13121-131.						
Examiner					Date Considered			
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LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT				Applicant Xi, et al.				
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Examiner Unknown								
U.S. Patent Documents								
*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate	
DA	A28	5,521,126	05/28/96	Okamura et al.	437	235	06/22/1994	
DA	A29	5,527,733	06/18/96	Nishizawa et al.	437	160	02/18/1994	
DA	A30	5,540,783	07/30/96	Eres et al.	118	725	05/26/1994	
DA	A31	5,601,651	02/11/97	Watabe	118	715	12/14/1994	
DA	A32	5,616,181	04/01/97	Yamamoto et al.	118	723 ER	11/21/1995	
DA	A33	5,641,984	06/24/97	Aftergut et al.	257	433	08/19/1994	
DA	A34	5,644,128	07/01/97	Wollnik et al.	250	251	08/25/1994	
DA	A35	5,707,880	01/13/98	Aftergut et al.	437	3	01/17/1997	
DA	A36	5,747,113	05/05/98	Tsai	427	255.5	07/29/1996	
DA	A37	5,749,974	05/12/98	Habuka et al.	118	725	07/13/1995	
DA	A38	5,796,116	08/18/98	Nakata et al.	257	66	07/25/1995	
DA	A39	5,807,792	09/15/98	Ilg et al.	438	758	12/18/1996	
DA	A40	5,830,270	11/03/98	McKee et al.	117	106	08/05/1996	
Foreign Patent Documents								
*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
DA	B10	00/79576 A1	12/28/2000	WO	H01L	21/205		X
DA	B11	00/79019 A1	12/28/2000	WO	C23C	16/00		X
DA	B12	00/63957 A1	10/26/2000	WO	H01L	21/205		X
OTHER ART								
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.						
DA	C5	George, et al., "Atomic layer controlled deposition of SiO <sub>2</sub> and Al <sub>2</sub> O <sub>3</sub> using ABAB... binary reaction sequence chemistry", <i>Appl. Surf. Sci.</i> , Vol. 82/83 (1994), pp. 460-467.						
DA	C6	Wise, et al., "Diethyldiethoxysilane as a new precursor for SiO <sub>2</sub> growth on silicon", <i>Mat. Res. Soc. Symp. Proc.</i> , Vol. 334 (1994), pp. 37-43.						
Examiner <i>Paul H. Smith</i>				Date Considered <i>10/12/00</i>				
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LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT				Applicant Xi, et al.			
(Use several sheets if necessary)				Filing Date October 03, 2000		Group 1G783 28003	
Examiner Unknown							

**U.S. Patent Documents**

*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date if Appropriate
[Signature]	A41	5,835,677	11/10/98	Li et al.	392	401	10/03/1996
[Signature]	A42	5,855,675	01/05/99	Doering et al.	118	719	03/03/1997
[Signature]	A43	5,858,102	01/12/99	Tsai	118	719	02/14/1998
[Signature]	A44	5,879,459	03/09/99	Gadgil et al.	118	715	08/29/1997
[Signature]	A45	5,904,565	05/18/1999	Nguyen, et al.	438	687	07/17/1997
[Signature]	A46	5,916,365	06/29/99	Sherman	117	92	08/16/1996
[Signature]	A47	5,923,056	07/13/99	Lee et al.	257	192	03/12/1998
[Signature]	A48	5,923,985	07/13/99	Aoki et al.	438	301	01/14/1997
[Signature]	A49	5,925,574	07/20/99	Aoki et al.	437	31	04/10/1992
[Signature]	A50	5,942,040	08/24/99	Kim et al.	118	726	08/27/1997
[Signature]	A51	5,947,710	09/07/1999	Cooper, et al.	418	63	06/16/1997
[Signature]	A52	5,972,430	10/26/99	DiMeo, Jr. et al.	427	255.32	11/26/1997
[Signature]	A53	6,001,669	12/14/99	Gaines et al.	438	102	07/21/1992
[Signature]	A54	6,174,377	01/16/2001	Doering, et al.	118	729	01/04/1999

**Foreign Patent Documents**


*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
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[Signature]	B13	00/54320 A1	09/14/2000	WO	H01L	21/44		X
[Signature]	B14	00/16377 A2	03/23/2000	WO	H01L	---		X
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**OTHER ART**

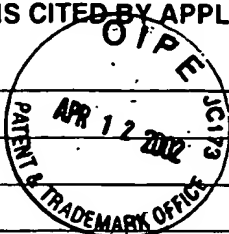
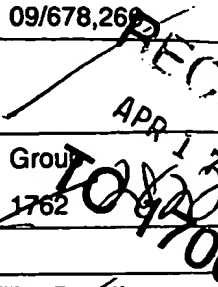
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
[Signature]	C7	Niinisto, et al., "Synthesis of oxide thin films and overlayers by atomic layer epitaxy for advanced applications", <i>Mat. Sci. &amp; Eng.</i> , Vol. B41 (1996), pp. 23-29.
[Signature]	C8	Ritala, et al., "Perfectly conformal TiN and Al <sub>2</sub> O <sub>3</sub> films deposited by atomic layer deposition", <i>Chemical Vapor Deposition</i> , Vol. 5(1) (January 1999), pp. 7-9.

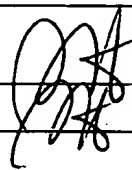
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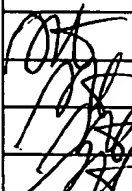
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Examiner Unknown								
U.S. Patent Documents								
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<i>OH</i>	A55	6,174,809	01/16/2001	Kang, et al.	438	682	12/15/1998	
<i>OH</i>	A56	6,203,613	03/20/2001	Gates, et al.	117	104	10/19/1999	
<i>OH</i>	A57	6,207,302	03/27/2001	Sugiura, et al.	428	690	03/02/1998	
<i>OH</i>	A58	6,248,605	06/19/2001	Harkonen, et al.	438	29	06/02/1999	
<i>OH</i>	A59	6,270,572	08/07/2001	Kim, et al.	117	93	08/09/1999	
<i>OH</i>	A60	6,287,965	09/11/2001	Kang, et al.	438	648	02/23/2000	
<i>OH</i>	A61	6,291,876	09/18/2001	Stumborg, et al.	257	632	08/20/1998	
<i>OH</i>	A62	6,305,314	10/23/2001	Sneh, et al.	118	723 R	12/17/1999	
<i>OH</i>	A63	6,306,216	10/23/2001	Kim, et al.	118	725	07/12/2000	
<i>OH</i>	A64	6,316,098	11/13/2001	Yitzchaik, et al.	428	339	03/23/1999	
<i>OH</i>	A65	2001/0000866	05/10/2001	Sneh, et al.	118	723 R	11/29/2000	
<i>OH</i>	A66	2001/0009140	07/26/2001	Bondestam, et al.	118	725	01/25/2001	
<i>OH</i>	A67	2001/0011526	08/09/2001	Doering, et al.	118	729	01/16/2001	
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<i>OH</i>	B16	99/41423 A2	08/19/1999	WO	C23C	---		X
<i>OH</i>	B17	96/18756 A1	06/20/1996	WO	C23C	16/08		X
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*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.						
<i>OH</i>	C9	Min, et al., "Atomic layer deposition of TiN thin films by sequential introduction of Ti precursor and NH/sub3", <i>Symp.: Advanced Interconnects and Contact Materials and Processes for Future Integrated Circuits</i> (Apr. 13-16, 1998), pp. 337-342.						
<i>OH</i>	C10	Klaus, et al., "Atomic Layer Deposition of Tungsten using Sequential Surface Chemistry with a Sacrificial Stripping Reaction," <i>Thin Solid Films</i> 360 (2000), Pages 145 - 153, (Accepted Nov. 16, 1999).						
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<p>*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with your communication to applicant.</p>								

U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)				Docket No. AMAT/4714.P1		Serial No. 09/678,266	
LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT				Applicant Xi, et al.			
(Use several sheets if necessary)				Filing Date October 03, 2000		Group 1762	
Examiner Unknown							

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*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate
	A68	2001/0031562	10/18/2001	Raaijmakers, et al.	438	770	02/22/2001
	A69	2001/0034123	10/25/2001	Jeon, et al.	438	643	04/06/2001
	A70						
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	B19	93/02111 A1	02/04/1993	WO	C03F	4/78		X
	B20	0 442 490 A1	08/21/1991	EP	C30B	25/02		X
	B21	0 344 352 A1	12/06/1989	EP	H01L	39/24		X

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*Examiner Initial	Including Author, Title, Date, Pertinent Pages, Etc.
	C11 Min, et al., "Metal-Organic Atomic-Layer Deposition of Titanium-Silicon-Nitride Films", <i>Applied Physics Letters</i> , American Inst. Of Physics, Vol 75(11) (Sept. 13, 1999).
	C12 Martensson, et al., "Atomic Layer Epitaxy of Copper on Tantalum", <i>Chemical Vapor Deposition</i> , 3(1) (Feb. 1, 1997), pp. 45-50.
Examiner	Date Considered 8/6/02

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U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)					Docket No. AMAT/4714.P1		Serial No. 09/678 266	
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Examiner Unknown								

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	A78					
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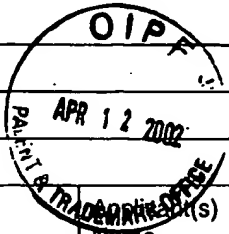
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	B25	03-286531	12/17/1991	JP	H01L 21/316		X
	B26	04-031396 A	02/03/1992	JP	C30B 25/14		X
	B27	06-291048	10/18/1994	JP	H01L 21/205		X
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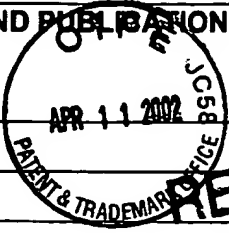
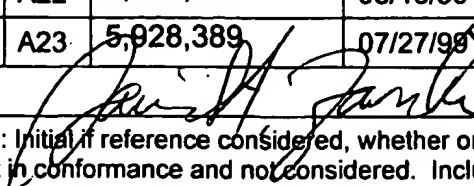
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	C14 Elers, et al., "NbC15 as a precursor in atomic layer epitaxy", <i>Appl. Surf. Sci.</i> , Vol. 82/83 (1994), pp. 468-474.
	C15 Lee, "The Preparation of Titanium-Based Thin Film by CVD Using Titanium Chlorides as Precursors", <i>Chemical Vapor Deposition</i> , 5(2) (Mar. 1999), pp. 69-73.
	C16 Martensson, et al., "Atomic Layer Epitaxy of Copper, Growth & Selectivity in the Cu (II)-2,2,6,6-Tetramethyl-3, 5-Heptanedione ATE/H2 Process", <i>J. Electrochem. Soc.</i> , 145(8) (Aug. 1998), pp. 2926-2931.

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	A81						
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	A88						
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	B31	198 20 147	07/01/1999	DE	H01L	21/3205	X
	B32	196 27 017	01/09/1997	DE	H01L	21/283	X
	B33	2 626 110	07/21/1989	FR	H01L	39/24	X
	B34	2 692 597	12/24/1993	FR	C23C	16/00	X
	B35	2 355 727	05/02/2001	GB	C23C	16/44	X
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*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.					
	C17	Min, et al., "Chemical Vapor Deposition of Ti-Si-N Films with Alternating Source Supply", <i>Mat., Res. Soc. Symp. Proc.</i> , Vol. 564 (Apr. 5, 1999), pp. 207-210					
	C18	Bedair, "Atomic layer epitaxy deposition processes", <i>J. Vac. Sci. Technol.</i> 12(1) (Jan/Feb 1994)					
	C19	Yamaga, et al., "Atomic layer epitaxy of ZnS by a new gas supplying system in a low-pressure metalorganic vapor phase epitaxy", <i>J. of Crystal Growth</i> 117 (1992), pp. 152-155					
	C20	Elam, et al., "Nucleation and growth during tungsten atomic layer deposition on SiO2 surfaces," <i>Thin Solid Films</i> 386 (2001) Pages 41 - 52, (Accepted Dec. 14, 2000).					
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OH	A2	4,917,556	04/17/90	Stark et al.	414	217	05/26/89	
OH	A3	4,951,601	08/28/90	Maydan, et al.	118	719	06/23/89	
OH	A4	5,000,113	03/19/91	Wang et al.	118	723	12/19/86	
OH	A5	5,186,718	02/16/93	Tepman et al.	29	25.01	04/15/91	
OH	A6	5,205,077	04/27/93	Wittstock	51	165 R	08/28/91	
OH	A7	5,234,561	08/10/93	Randhawa et al.	204	192.38	08/25/88	
OH	A8	5,259,881	11/09/93	Edwards, et al.	118	719	05/17/91	
OH	A9	5,286,296	02/15/94	Sato et al.	118	719	01/09/92	
OH	A10	5,609,689	03/11/97	Kato et al.	118	719	06/03/96	
OH	A11	5,667,592	09/16/97	Boitnott et al.	118	719	04/16/96	
OH	A12	5,674,786	10/07/97	Turner et al.	437	225	06/05/95	
OH	A13	5,695,564	12/09/97	Imahashi	118	719	08/03/95	
OH	A14	5,730,801	03/24/98	Tepman et al.	118	719	08/23/94	
OH	A15	5,788,447	08/04/98	Yonemitsu et al.	414	217	08/05/96	
OH	A16	5,788,799	08/04/98	Steger, et al.	156	345	06/11/96	
OH	A17	5,801,634	09/01/98	Young et al.	340	635	09/08/97	
OH	A18	5,856,219	01/05/99	Naito et al.	438	241	08/18/97	
OH	A19	5,866,213	02/02/99	Foster et al.	427	573	07/19/97	
OH	A20	5,866,795	02/02/99	Wang et al.	73	1.36	03/17/97	
OH	A21	5,882,165	03/16/99	Maydan et al.	414	217	09/10/97	
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OA	A24	6,051,286	04/18/00	Zhao et al.	427	576	08/22/97
OA	A25	6,062,798	05/16/00	Muka	414	416	06/13/96
OA	A26	6,071,808	06/06/00	Merchant et al.	438	633	06/23/99
OA	A27	6,084,302	07/04/00	Sandhu	257	751	12/26/95
OA	A28	6,086,677	07/11/00	Umotoy et al.	118	715	06/16/98
OA	A29	6,110,556	08/29/00	Bang, et al.	428	64.1	10/17/97
OA	A30	6,117,244	09/12/00	Bang, et al.	118	715	03/24/98
OA	A31	6,140,237	10/31/00	Chan et al.	438	687	04/19/99
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OA	A33	6,143,659	11/07/00	Leem	438	688	08/27/98
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OA	A35	6,158,446	12/12/00	Mohindra et al.	134	25.4	09/04/98
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OA	A37	6,271,148	08/07/01	Kao et al.	438	727	10/13/99
OA	A38	2001/0041250	11/15/01	Werkhoven et al.	428	212	03/06/01

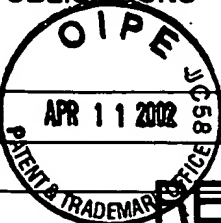
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Examiner <i>David H. Zamboni</i>					Date Considered <i>8/6/02</i>			
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Examiner <i>Paul H. Jurek</i>					Date Considered <i>8/6/2</i>			
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with your communication to applicant.								

U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)					Docket No. APPM/4714.P1		Serial No. 09/678,266	
SUPPLEMENTAL LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT					Applicant Kori, et al.		Confirmation No.: Unknown	
(Use several sheets if necessary)					Filing Date October 30, 2000		Group 1762 2827	
Examiner Unknown					RECEIVED APR 11 2002 OIPF JCS PATENT & TRADEMARK OFFICE			
Foreign Patent Documents								
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Examiner <i>[Signature]</i>					Date Considered 8/6/02			
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SUPPLEMENTAL LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT		Applicant Kori, et al.	Confirmation No.: Unknown
(Use several sheets if necessary)		Filing Date October 30, 2000	Group 1762 2827
Examiner: Unknown			

## Foreign Patent Documents

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(PTO Form 1449 modified)		APPM/4714.P1	09/678,266
SUPPLEMENTAL LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT		Applicant	Confirmation No.:
		Kori, et al.	Unknown
(Use several sheets if necessary)		Filing Date	Group
Examiner Unknown		October 30, 2000	1762 2827

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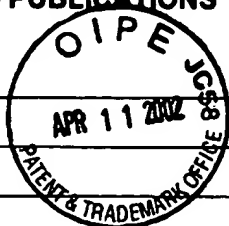
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U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)		Docket No. APPM/4714.P1	Serial No. 09/678,266
SUPPLEMENTAL LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT		Applicant Kori, et al.	Confirmation No.: Unknown
(Use several sheets if necessary)		Filing Date October 30, 2000	Group 17822827
Examiner	Unknown		



## OTHER ART

*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
PAZ	C1	Ohba, et al., "Thermal Decomposition of Methylhydrazine and Deposition Properties of CVD TiN Thin Films", Conference Proceedings, Advanced Metallization for ULSI Applications in 1993 (1994), pp. 143-149
PAZ	C2	Scheper, et al., "Low-temperature deposition of titanium nitride films from dialkylhydrazine-based precursors", Materials Science in Semiconductor Processing 2 (1999), pp. 149-157
PAZ	C3	Suzuki, et al., "A 0.2- $\mu$ m contact filing by 450°C-hydrazine-reduced TiN film with low resistivity", IEDM 92-979, pp. 11.8.1 - 11.8.3
PAZ	C4	Suzuki, et al., "LPCVD-TiN Using Hydrazine and TiCl <sub>4</sub> ", VMIC Conference (June 8-9, 1993), pp. 418-423
PAZ	C5	IBM Tech. Disc. Bull. "Knowledge-Based Dynamic Scheduler in Distributed Computer Control, (June 1990), pp. 80-84
PAZ	C6	IBM Tech. Disc. Bull. "Multiprocessor and Multitasking Architecture for Tool Control of the Advanced via Inspection Tools" (May 1992), pp. 190-191
PAZ	C7	McGeachin, S., "Synthesis and properties of some $\beta$ -diketimines derived from acetylacetone, and their metal complexes", Canadian J. of Chemistry, Vol. 46 (1968), pp.1903-1912
PAZ	C8	Solanki, et al., "Atomic Layer deposition of Copper Seed Layers", Electrochemical and Solid State Letters, 3(10) (2000), pp. 479-480
PAZ	C9	NERAC.COM Retro Search: Atomic Layer Deposition of Copper, dated October 11, 2001
PAZ	C10	NERAC.COM Retro Search: Atomic Layer Deposition / Epitaxy Aluminum Oxide Plasma, dated October 2, 2001
PAZ	C11	NERAC Search abstract of "Atomic Layer deposition of Ta and Ti for Interconnect Diffusion Barriers", by Rossnagel, et al., J. Vac. Sci. & Tech., 18(4) (July 2000)
PAZ	C12	Abstracts of articles re atomic layer deposition
PAZ	C13	Abstracts of search results re atomic layer deposition, search dated January 24, 2002
PAZ	C14	Abstracts of articles re atomic layer deposition and atomic layer nucleation
PAZ	C15	Abstracts of articles re atomic layer deposition and semiconductors and copper
Examiner	Date Considered 8/6/02	

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SUPPLEMENTAL LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT			Applicant Kori, et al.	Confirmation No.: Unknown
(Use several sheets if necessary)			Filing Date October 30, 2000	Group 1762 2827
Examiner Unknown				
OTHER ART				
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.		
MAZ	C16	Abstracts of articles – atomic layer deposition		
MAZ	C17	NERAC Search – Atomic Layer Deposition, search dated October 16, 2001		
MAZ	C18	Bader, et al., "Integrated Processing Equipment", Solid State Technology, Cowan Pub., Vol. 33, No. 5 (May 1, 1990), pp. 149-154		
MAZ	C19	Choi, et al., "The effect of annealing on resistivity of low pressure chemical vapor deposited titanium diboride", J. Appl. Phys. 69(11) (June 1, 1991), pp. 7853-7861		
MAZ	C20	Choi, et al., "Stability of TiB <sub>2</sub> as a Diffusion Barrier on Silicon", J. Electrochem. Soc. 138(10) (October 1991), pp. 3062-3067		
MAZ	C21	"Cluster Tools for Fabrication of Advanced devices" Jap. J. of Applied Physics, Extended Abstracts, 22 <sup>nd</sup> Conference Solid State Devices and Materials (1990), pp. 849 – 852 XP000178141 (ARTICLE ON ORDER – TO BE PROVIDED)		
MAZ	C22	"Applications of Integrated processing", Solid State Technology, US, Cowan Pub., Vol 37, No. 12 (December 1, 1994), pp. 45-47		
MAZ	C23	Kitigawa, et al., "Hydrogen-mediated low temperature epitaxy of Si in plasma-enhanced chemical vapor deposition", Applied Surface Science (2000), pp. 30-34 (ARTICLE ON ORDER – TO BE PROVIDED)		
MAZ	C24	Lee, et al., "Pulsed nucleation for ultra-high aspect ratio tungsten plugfill", Novellus Systems, Inc. (2001), pp. 1-2 (ARTICLE ON ORDER – TO BE PROVIDED)		
Examiner	David H. Zink		Date Considered	8/6/02
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Sheet 1 of 4

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Application Number 09/678,866  
Filing Date 10/03/2000  
First Named Inventor Ming Xi  
Group Art Unit 1762 2827  
Examiner Name Unassigned FARNIXE  
Attorney Docket Number 4714P1/AMI-11

## U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code <sup>2</sup> (if known)			
<i>[Handwritten initials]</i>	AJ	4,058,430		Suntola et al.	11-15-1977	
	AK	4,389,973		Suntola et al.	06-28-1983	
	AL	4,413,022		Suntola et al.	11-01-1983	
	AM	4,767,494		Kobayashi et al.	08-30-1988	
	AN	4,806,321		Nishizawa et al.	02-21-1989	
	AO	4,840,921		Matsumoto	06-20-1989	
	AP	4,845,049		Sunakawa	07-04-1989	
	AQ	4,859,627		Sunakawa	08-22-1989	
	AR	4,861,417		Mochizuki et al.	08-29-1989	
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	AT	4,993,357		Scholz	02-19-1991	
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	AV	5,130,269		Kitahara et al.	07-14-1992	
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## FOREIGN PATENT DOCUMENTS

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Sheet 2 of 4

Application Number	09/678,266
Filing Date	10/03/2000
First Named Inventor	Ming Xi
Group Art Unit	1762 2827
Examiner Name	Unassigned JAMES
Attorney Docket Number	4714P1/AMI-11

## U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code <sup>2</sup> (if known)			
<i>JA</i>	BD	5,290,748		Knuuttila et al.	03-01-1994	
<i>JA</i>	BE	5,294,286		Nishizawa et al.	03-15-1994	
<i>JA</i>	BF	5,300,186		Kitahara et al.	04-05-1994	
<i>JA</i>	BG	5,316,793		Wallace et al.	05-31-1994	
<i>JA</i>	BH	5,330,610		Eres et al.	07-19-1994	
<i>JA</i>	BI	5,336,324		Stall et al.	08-09-1994	
<i>JA</i>	BJ	5,338,389		Nishizawa et al.	08-16-1994	
<i>JA</i>	BK	5,395,791		Cheng et al.	03-07-1995	
<i>JA</i>	BL	5,443,033		Nishizawa et al.	08-22-1995	
<i>JA</i>	BM	5,458,084		Thome et al.	10-17-1995	
<i>JA</i>	BN	5,480,818		Matsumoto et al.	01-02-1996	
<i>JA</i>	BO	5,484,664		Kitahara et al.	01-16-1996	
<i>JA</i>	BP	5,483,919		Yokoyama et al.	01-16-1996	
<i>JA</i>	BQ	5,532,511		Nishizawa et al.	07-02-1996	
<i>JA</i>	BR	5,637,530		Gaines et al.	06-10-1997	
<i>JA</i>	BS	5,693,139		Nishizawa et al.	12-02-1997	
<i>JA</i>	BT	5,705,224		Murota et al.	01-06-1998	
<i>JA</i>	BU	5,711,811		Suntola et al.	01-27-1998	
<i>JA</i>	BV	5,730,802		Ishizumi et al.	03-24-1998	
<i>JA</i>	BW	5,851,849		Comizzoli et al.	12-22-1998	

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**TC 1700**

## FOREIGN PATENT DOCUMENTS

[illegible]

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<sup>1</sup>Unique citation designation number. <sup>2</sup>See attached Kinds of U.S. Patent Documents. <sup>3</sup>Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup>For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup>Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup>Applicant is to place a check mark here if English language Translation is attached.

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PTO/SB/D&amp;A (08-00)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet

3

of

4

**Application Number**

09/678.266

**Filing Date**

10/03/2000

**First Named Inventor**

**Ming Xi**

### Group Art Unit

~~1762~~

**Examiner Name**

Unassigned **JARNEK**

Attorney Docket Number

4714P1/AMI-11

## U.S. PATENT DOCUMENTS

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## FOREIGN PATENT DOCUMENTS

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# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Use as many sheets as necessary)

Sheet 4 of 4

<b>Application Number</b>	<b>09/678,266</b>
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<b>Filing Date</b>	10/03/2000
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<b>First Named Inventor</b>	Ming Xi
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Group Art Unit	1762
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Examiner Name	Unknown
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Attorney Docket Number 4714P1/AMI-11

## OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

[illegible]

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Date  
Considered

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**Complete if Known**

Application Number	unassigned 89/078246
Filing Date	Unassigned
First Named Inventor	Ming Xi
Group Art Unit	Unassigned 2823
Examiner Name	Unassigned SARNEKE
Attorney Docket Number	4714 P4/AMI-00-11

*(use as many sheets as necessary)*

Sheet 1 of 2

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Complete if Known *9/678266*

Application Number	unassigned
Filing Date	unassigned
First Named Inventor	Ming Xi
Group Art Unit	unassigned 2827
Examiner Name	unassigned JAPWA
Attorney Docket Number	4774 P1/AMI-00-11

*(use as many sheets as necessary)*

Sheet	2	of	2
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Attorney Docket Number	4714 P1/AMI-00-11
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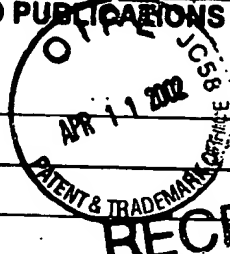
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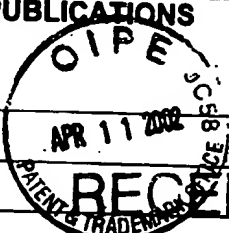
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U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)				Docket No. APPM/4714.P1		Serial No. 09/678,266	
SUPPLEMENTAL LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT				Applicant Kori, et al.		Confirmation No.: Unknown	
(Use several sheets if necessary)				Filing Date October 30, 2000		Group 1762 2827	
Examiner Unknown				RECEIVED APR 15 2002			
U.S. Patent Documents							
*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date if Appropriate
PH	A1	4,813,846	03/21/89	Helms	414	744.1	04/29/87
PH	A2	4,917,556	04/17/90	Stark et al.	414	217	05/26/89
PH	A3	4,951,601	08/28/90	Maydan, et al.	118	719	06/23/89
PH	A4	5,000,113	03/19/91	Wang et al.	118	723	12/19/86
PH	A5	5,186,718	02/16/93	Tepman et al.	29	25.01	04/15/91
PH	A6	5,205,077	04/27/93	Wittstock	51	165 R	08/28/91
PH	A7	5,234,561	08/10/93	Randhawa et al.	204	192.38	08/25/88
PH	A8	5,259,881	11/09/93	Edwards, et al.	118	719	05/17/91
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PH	A10	5,609,689	03/11/97	Kato et al.	118	719	06/03/96
PH	A11	5,667,592	09/16/97	Boitnott et al.	118	719	04/16/96
PH	A12	5,674,786	10/07/97	Turner et al.	437	225	06/05/95
PH	A13	5,695,564	12/09/97	Imahashi	118	719	08/03/95
PH	A14	5,730,801	03/24/98	Tepman et al.	118	719	08/23/94
PH	A15	5,788,447	08/04/98	Yonemitsu et al.	414	217	08/05/96
PH	A16	5,788,799	08/04/98	Steger, et al.	156	345	06/11/96
PH	A17	5,801,634	09/01/98	Young et al.	340	635	09/08/97
PH	A18	5,856,219	01/05/99	Naito et al.	438	241	08/18/97
PH	A19	5,866,213	02/02/99	Foster et al.	427	573	07/19/97
PH	A20	5,866,795	02/02/99	Wang et al.	73	1.36	03/17/97
PH	A21	5,882,165	03/16/99	Maydan et al.	414	217	09/10/97
PH	A22	5,882,413	03/16/99	Beaulieu et al.	118	719	07/11/97
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Examiner <i>[Signature]</i>				Date Considered 8/6/02			
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U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)						Docket No. APPM/4714.P1		Serial No. 09/678,266	
<b>SUPPLEMENTAL LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT</b>						Applicant Kori, et al.		Confirmation No.: Unknown	
(Use several sheets if necessary)						Filing Date October 30, 2000		Group 1782 2827	
Examiner      Unknown									
<b>Foreign Patent Documents</b>									
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Examiner <i>David H. Zamb</i>						Date Considered <i>8/6/02</i>			
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<b>SUPPLEMENTAL LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT</b>					Applicant Kori, et al.		Confirmation No.: Unknown	
(Use several sheets if necessary)					Filing Date October 30, 2000		Group <b>1782 2827</b>	
Examiner Unknown								
<b>Foreign Patent Documents</b>								
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Examiner <i>Paul A. Smith</i>				Date Considered <i>8/6/12</i>				

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Examiner Unknown

Docket No.

APPM/4714.P1

Serial No.

09/678,266

Applicant

Kori, et al.

Confirmation No.

Unknown

Filing Date

October 30, 2000

Group

1762

## Foreign Patent Documents

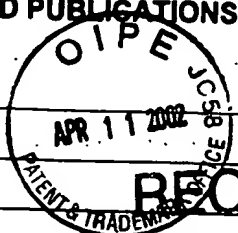
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(PTO Form 1449 modified)				APPM/4714.P1		09/678,266		
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				Kori, et al.		Unknown		
(Use several sheets if necessary)				Filing Date		Group		
Examiner Unknown				October 30, 2000		1762 2827		
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Examiner <i>[Signature]</i>				Date Considered 8/6/02				



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Unknown

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Examiner Unknown

Filing Date

October 30, 2000

Group

1762 2527

Foreign Patent Documents

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8/6/2

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**SUPPLEMENTAL LIST OF PATENTS AND PUBLICATIONS  
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1762 282.7

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**Foreign Patent Documents**

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Examiner Unknown

Docket No.

APPM/4714.P1

Serial No.

09/678,266

Confirmation No.:

Unknown

Filing Date

October 30, 2000

Group

1762 2827

## Foreign Patent Documents

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U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)		APR 15 2002 TC 1700	Docket No. APPM/4714.P1	Serial No. 09/678,266
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(Use several sheets if necessary)			Filing Date October 30, 2000	Group 17822827
Examiner Unknown				
OTHER ART				
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.		
PZ	C1	Ohba, et al., "Thermal Decomposition of Methylhydrazine and Deposition Properties of CVD TiN Thin Films", Conference Proceedings, Advanced Metallization for ULSI Applications in 1993 (1994), pp. 143-149		
PZ	C2	Schepfer, et al., "Low-temperature deposition of titanium nitride films from dialkylhydrazine-based precursors", Materials Science in Semiconductor Processing 2 (1999), pp. 149-157		
PZ	C3	Suzuki, et al., "A 0.2-μm contact filing by 450°C-hydrazine-reduced TiN film with low resistivity", IEDM 92-979, pp. 11.8.1 - 11.8.3		
PZ	C4	Suzuki, et al., "LPCVD-TiN Using Hydrazine and TiCl <sub>4</sub> ", VMIC Conference (June 8-9, 1993), pp. 418-423		
PZ	C5	IBM Tech. Disc. Bull. "Knowledge-Based Dynamic Scheduler in Distributed Computer Control, (June 1990), pp. 80-84		
PZ	C6	IBM Tech. Disc. Bull. "Multiprocessor and Multitasking Architecture for Tool Control of the Advanced via Inspection Tools" (May 1992), pp. 190-191		
PZ	C7	McGeachin, S., "Synthesis and properties of some β-diketimines derived from acetylacetone, and their metal complexes", Canadian J. of Chemistry, Vol. 46 (1968), pp. 1903-1912		
PZ	C8	Solanki, et al., "Atomic Layer deposition of Copper Seed Layers", Electrochemical and Solid State Letters, 3(10) (2000), pp. 479-480		
PZ	C9	NERAC.COM Retro Search: Atomic Layer Deposition of Copper, dated October 11, 2001		
PZ	C10	NERAC.COM Retro Search: Atomic Layer Deposition / Epitaxy Aluminum Oxide Plasma, dated October 2, 2001		
PZ	C11	NERAC Search abstract of "Atomic Layer deposition of Ta and Ti for Interconnect Diffusion Barriers", by Rossnagel, et al., J. Vac. Sci. & Tech., 18(4) (July 2000)		
PZ	C12	Abstracts of articles re atomic layer deposition		
PZ	C13	Abstracts of search results re atomic layer deposition, search dated January 24, 2002		
PZ	C14	Abstracts of articles re atomic layer deposition and atomic layer nucleation		
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Examiner [Signature]		Date Considered 8/6/02		
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(Use several sheets if necessary)		Filing Date October 30, 2000	Group 1762 <i>2827</i>
Examiner Unknown			
<b>OTHER ART</b>			
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<i>MAE</i>	C16	Abstracts of articles – atomic layer deposition	
<i>MAE</i>	C17	NERAC Search – Atomic Layer Deposition, search dated October 16, 2001	
<i>MAE</i>	C18	Bader, et al., "Integrated Processing Equipment", Solid State Technology, Cowan Pub., Vol. 33, No. 5 (May 1, 1990), pp. 149-154	
<i>MAE</i>	C19	Choi, et al., "The effect of annealing on resistivity of low pressure chemical vapor deposited titanium diboride", J. Appl. Phys. 69(11) (June 1, 1991), pp. 7853-7861	
<i>MAE</i>	C20	Choi, et al., "Stability of TiB <sub>2</sub> as a Diffusion Barrier on Silicon", J. Electrochem. Soc. 138(10) (October 1991), pp. 3062-3067	
<i>MAE</i>	C21	"Cluster Tools for Fabrication of Advanced devices" Jap. J. of Applied Physics, Extended Abstracts, 22 <sup>nd</sup> Conference Solid State Devices and Materials (1990), pp. 849 – 852 XP000178141 (ARTICLE ON ORDER – TO BE PROVIDED)	
<i>MAE</i>	C22	"Applications of Integrated processing", Solid State Technology, US, Cowan Pub., Vol 37, No. 12 (December 1, 1994), pp. 45-47	
<i>MAE</i>	C23	Kitigawa, et al., "Hydrogen-mediated low temperature epitaxy of Si in plasma-enhanced chemical vapor deposition", Applied Surface Science (2000), pp. 30-34 (ARTICLE ON ORDER – TO BE PROVIDED)	
<i>MAE</i>	C24	Lee, et al., "Pulsed nucleation for ultra-high aspect ratio tungsten plugfill", Novellus Systems, Inc. (2001), pp. 1-2 (ARTICLE ON ORDER – TO BE PROVIDED)	
Examiner		Date Considered <i>8/6/02</i>	
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with your communication to applicant.			

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LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT (Use several sheets if necessary)					Applicant Kori, et al.		Confirmation No. 4642	
Examiner Zameke, D.					Filing Date 10/03/2000		Group 2827	
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OH	A1	2001/0042799 A1	11/22/2001	Kim, et al.	239	553	02/02/2001	
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OH	C1	"Cluster Tools for Fabrication of Advanced Devices" Jap. J of Applied Physics, Extended Abstracts 22 <sup>nd</sup> Conference Solid State Devices and Materials (1990), pp. 849- 852						
OH	C2	Kitigawa, et al., "Hydrogen-mediated low temperature epitaxy of Si in plasma-enhanced chemical vapor deposition", Applied Surface Science (2000), pp. 30-34						
OH	C3	Lee, et al., "Pulsed nucleation for ultra-high aspect ratio tungsten plugfill", Novellus Systems, Inc. (2001), pp. 1-2 (COPY NOT AVAILABLE TO APPLICANT AT THIS TIME)						
Examiner					Date Considered 8/6/2			
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of

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**Complete if Known**

Application Number	09/678,266
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<b>Filing Date</b>	10/3/2000
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<b>First Named Inventor</b>	Ming Xi
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Group Art Unit	<del>4702</del> 2822
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Examiner Name	unassigned <b>ZARWEL</b>
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**Attorney Docket Number** 4714P1/AMI-11

## U.S. PATENT DOCUMENTS

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## FOREIGN PATENT DOCUMENTS

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<sup>1</sup>Unique citation designation number. <sup>2</sup>See attached Kinds of U.S. Patent Documents. <sup>3</sup>Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup>For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup>Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup>Applicant is to place a check mark here if English language Translation is attached.

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### Alkaline Number

**09/678,266**

## Filing Late

10/3/2000

**First Named Inventor**

**Ming Xi**

## Group Art Unit

1702 2823

**Examiner Name**

~~UNASSIGNED~~ A ZARNER

Attorney Docket Number

4714P1/AMI-11

Examiner  
Initials\*Cite  
No.

Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.

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*[Signature]*

**CQ**

Kitagawa et al. Hydrogen-mediated low-temperature epitaxy of Si in plasma-enhanced chemical vapor deposition, *Applied Surface Science*, pp. 30-4 (2000).

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**Examiner  
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David H. Farnish

Date \_\_\_\_\_

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8/6/2

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**Complete if Known**

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Sheet	1	of	2
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Application Number	unassigned
Filing Date	Unassigned
First Named Inventor	Ming Xi
Group Art Unit	Unassigned 2827
Examiner Name	Unassigned BARNEKE
Attorney Docket Number	4714 P1/AMI-00-11

U.S. PATENT DOCUMENTS

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**FOREIGN PATENT DOCUMENTS**

[illegible]

**Examiner  
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Date  
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<sup>1</sup> Unique citation designation number. <sup>2</sup> See attached Kinds of U.S. Patent Documents. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

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Sheet	2	of	2
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**Complete if Known**

Application Number	unassigned
Filing Date	unassigned
First Named Inventor	Ming Xi
Group Art Unit	unassigned 2823
Examiner Name	unassigned 2APR/2016
Attorney Docket Number	4714 P1/AMI-00-11

**OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

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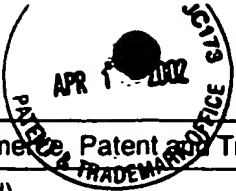
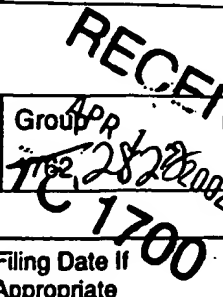
Examiner Signature	<i>Janet H. Farnell</i>	Date Considered	<i>8/6/2</i>
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U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)					Docket No. AMAT/4714.P1		Serial No. 09/678,266	
LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT					Applicant Xi, et al.			
(Use several sheets if necessary)					Filing Date October 03, 2000		Group 1762 2825	
Examiner Unknown								
<b>U.S. Patent Documents</b>								
*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate	
DA	A1	4,486,487	12/04/84	Skarp	428	216	04/25/1983	
DA	A2	4,829,022	05/09/89	Kobayashi et al.	437	107	12/09/1986	
DA	A3	4,834,831	05/30/89	Nishizawa et al.	156	611	09/04/1987	
DA	A4	4,838,983	06/13/89	Schumaker et al.	156	613	03/18/1988	
DA	A5	4,838,993	06/18/89	Aoki et al.	156	643	12/03/1987	
DA	A6	4,859,625	08/22/89	Nishizawa et al.	437	81	11/20/1987	
DA	A7	4,927,670	05/22/1990	Erbil	427	255.3	06/22/1988	
DA	A8	4,931,132	06/05/90	Aspnes et al.	156	601	10/07/1988	
DA	A9	4,960,720	10/02/90	Shimbo	437	105	08/24/1987	
DA	A10	4,975,252	12/04/90	Nishizawa et al.	422	245	05/26/1989	
DA	A11	5,013,683	05/07/91	Petroff et al.	437	110	01/23/1989	
DA	A12	5,085,885	02/04/92	Foley et al.	477	38	09/10/1990	
DA	A13	5,091,320	02/25/92	Aspnes et al.	437	8	06/15/1990	
<b>Foreign Patent Documents</b>								
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DA	B1	01/66832 A2	09/13/2001	WO	C30B	16/44		X
DA	B2	01/40541 A1	06/07/2001	WO	C23C	16/40		X
DA	B3	01/36702 A1	05/25/2001	WO	C23C	16/00		X
DA	B4	01/29893 A1	04/26/2001	WO	H01L	21/768		X
DA	B5	01/29891 A1	04/26/2001	WO	H01L	21/768		X
<b>OTHER ART</b>								
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.						
DA	C1	Hultman, et al., "Review of the thermal and mechanical stability of TiN-based thin films", <i>Zeitschrift Fur Metallkunde</i> , 90(10) (Oct. 1999), pp. 803-813.						
DA	C2	Klaus, et al., "Atomic Layer Deposition of SiO <sub>2</sub> Using Catalyzed and Uncatalyzed Self-Limiting Surface Reactions", <i>Surface Review &amp; Letters</i> , 6(3&4) (1999), pp. 405-448.						
Examiner					Date Considered 8/6/2			
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(Use several sheets if necessary)					Filing Date October 03, 2000		Group	
Examiner      Unknown								

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<i>DA</i>	A14	5,246,536	09/21/93	Nishizawa et al.	156	610	03/10/1989	
<i>DA</i>	A15	5,254,207	10/19/93	Nishizawa et al.	156	601	11/30/1992	
<i>DA</i>	A16	5,296,403	03/22/94	Nishizawa et al.	437	133	10/23/1992	
<i>DA</i>	A17	5,311,055	05/10/94	Goodman et al.	257	593	11/22/1991	
<i>DA</i>	A18	5,316,615	05/31/94	Copel	117	95	03/09/1993	
<i>DA</i>	A19	5,348,911	09/20/94	Jurgensen et al.	117	91	04/26/1993	
<i>DA</i>	A20	5,374,570	12/20/94	Nasu et al.	437	40	08/19/1993	
<i>DA</i>	A21	5,438,952	08/08/1995	Otsuka	117	84	01/31/1994	
<i>DA</i>	A22	5,439,876	08/08/95	Graf et al.	505	447	08/16/1993	
<i>DA</i>	A23	5,441,703	08/15/95	Jurgensen	422	129	03/29/1994	
<i>DA</i>	A24	5,443,647	08/22/95	Aucoin et al.	118	723 ME	07/11/1994	
<i>DA</i>	A25	5,455,072	10/03/95	Bension et al.	427	255.7	11/18/1992	
<i>DA</i>	A26	5,469,806	11/28/95	Mochizuki et al.	117	97	08/20/1993	
<i>DA</i>	A27	5,503,875	04/02/96	Imai et al.	427	255.3	03/17/1994	

**Foreign Patent Documents**

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<i>DA</i>	B6	01/29280 A1	04/26/2001	WO	C23C	16/32		X
<i>DA</i>	B7	01/27347 A1	04/19/2001	WO	C23C	16/44		X
<i>DA</i>	B8	01/27346 A1	04/19/2001	WO	C23C	16/44		X
<i>DA</i>	B9	01/15220 A1	03/01/2001	WO	H01L	21/768		X

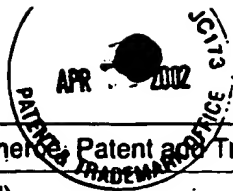
**OTHER ART**

*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
<i>DA</i>	C3	Yamaguchi, et al., "Atomic-layer chemical-vapor-deposition of silicon dioxide films with extremely low hydrogen content", <i>Appl. Surf. Sci.</i> , Vol. 130-132 (1998), pp. 202-207.
<i>DA</i>	C4	George, et al., "Surface Chemistry for Atomic Layer Growth", <i>J. Phys. Chem.</i> , Vol. 100 (1996), pp. 13121-131.

Examiner *David A. Jensen*      Date Considered *8/6/02*

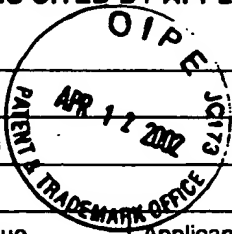
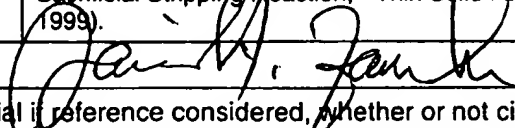
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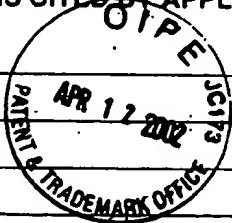
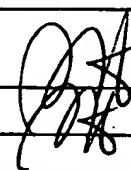
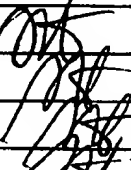

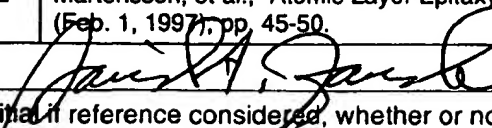



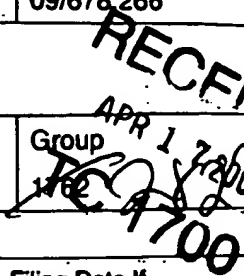
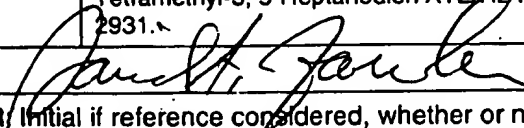
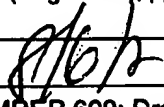


U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)					Docket No. AMAT/4714.P1		Serial No. 09/678,266	
LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT (Use several sheets if necessary)					Applicant Xi, et al.		Filing Date October 03, 2000	
Examiner Unknown					Group 1		1082 2828 1700	
<b>U.S. Patent Documents</b>								
*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate	
DA	A28	5,521,126	05/28/96	Okamura et al.	437	235	06/22/1994	
DA	A29	5,527,733	06/18/96	Nishizawa et al.	437	160	02/18/1994	
DA	A30	5,540,783	07/30/96	Eres et al.	118	725	05/26/1994	
DA	A31	5,601,651	02/11/97	Watabe	118	715	12/14/1994	
DA	A32	5,616,181	04/01/97	Yamamoto et al.	118	723 ER	11/21/1995	
DA	A33	5,641,984	06/24/97	Aftergut et al.	257	433	08/19/1994	
DA	A34	5,644,128	07/01/97	Wollnik et al.	250	251	08/25/1994	
DA	A35	5,707,880	01/13/98	Aftergut et al.	437	3	01/17/1997	
DA	A36	5,747,113	05/05/98	Tsai	427	255.5	07/29/1996	
DA	A37	5,749,974	05/12/98	Habuka et al.	118	725	07/13/1995	
DA	A38	5,796,116	08/18/98	Nakata et al.	257	66	07/25/1995	
DA	A39	5,807,792	09/15/98	Ilg et al.	438	758	12/18/1996	
DA	A40	5,830,270	11/03/98	McKee et al.	117	106	08/05/1996	
<b>Foreign Patent Documents</b>								
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DA	B10	00/79576 A1	12/28/2000	WO	H01L	21/205		X
DA	B11	00/79019 A1	12/28/2000	WO	C23C	16/00		X
DA	B12	00/63957 A1	10/26/2000	WO	H01L	21/205		X
<b>OTHER ART</b>								
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.						
DA	C5	George, et al., "Atomic layer controlled deposition of SiO <sub>2</sub> and Al <sub>2</sub> O <sub>3</sub> using ABAB...binary reaction sequence chemistry", <i>Appl. Surf. Sci.</i> , Vol. 82/83 (1994), pp. 460-467.						
DA	C6	Wise, et al., "Diethyldiethoxysilane as a new precursor for SiO <sub>2</sub> growth on silicon", <i>Mat. Res. Soc. Symp. Proc.</i> , Vol. 334 (1994), pp. 37-43.						
Examiner					Date Considered			
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	A41	5,835,677	11/10/98	Li et al.	392	401	10/03/1996
	A42	5,855,675	01/05/99	Doering et al.	118	719	03/03/1997
	A43	5,858,102	01/12/99	Tsai	118	719	02/14/1998
	A44	5,879,459	03/09/99	Gadgil et al.	118	715	08/29/1997
	A45	5,804,665	05/18/1999	Nguyen, et al.	438	687	07/17/1997
	A46	5,916,365	06/29/99	Sherman	117	92	08/16/1996
	A47	5,923,056	07/13/99	Lee et al.	257	192	03/12/1998
	A48	5,923,985	07/13/99	Aoki et al.	438	301	01/14/1997
	A49	5,925,574	07/20/99	Aoki et al.	437	31	04/10/1992
	A50	5,942,040	08/24/99	Kim et al.	118	726	08/27/1997
	A51	5,947,710	09/07/1999	Cooper, et al.	418	63	06/16/1997
	A52	5,972,430	10/26/99	DiMeo, Jr. et al.	427	255.32	11/26/1997
	A53	6,001,669	12/14/99	Gaines et al.	438	102	07/21/1992
	A54	6,174,377	01/16/2001	Doering, et al.	118	729	01/04/1999
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	B13	00/54320 A1	09/14/2000	WO	H01L	21/44	YES NO
	B14	00/16377 A2	03/23/2000	WO	H01L	---	YES NO
	B15	00/15881 A2	03/23/2000	WO	C30B	---	YES NO
OTHER ART							
*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.					
	C7	Niinisto, et al., "Synthesis of oxide thin films and overlayers by atomic layer epitaxy for advanced applications", <i>Mat. Sci. &amp; Eng.</i> , Vol. B41 (1996), pp. 23-29.					
	C8	Ritala, et al., "Perfectly conformal TiN and Al <sub>2</sub> O <sub>3</sub> films deposited by atomic layer deposition", <i>Chemical Vapor Deposition</i> , Vol. 5(1) (January 1999), pp. 7-9.					
Examiner				Date Considered			
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LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT				Applicant Xi, et al.			
(Use several sheets if necessary)				Filing Date October 03, 2000		Group 1762	
Examiner Unknown							
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A55	6,174,809	01/16/2001	Kang, et al.	438	682	12/15/1998	
A56	6,203,613	03/20/2001	Gates, et al.	117	104	10/19/1999	
A57	6,207,302	03/27/2001	Sugiura, et al.	428	690	03/02/1998	
A58	6,248,605	06/19/2001	Harkonen, et al.	438	29	06/02/1999	
A59	6,270,572	08/07/2001	Kim, et al.	117	93	08/09/1999	
A60	6,287,965	09/11/2001	Kang, et al.	438	648	02/23/2000	
A61	6,291,876	09/18/2001	Stumborg, et al.	257	632	08/20/1998	
A62	6,305,314	10/23/2001	Sneh, et al.	118	723 R	12/17/1999	
A63	6,306,216	10/23/2001	Kim, et al.	118	725	07/12/2000	
A64	6,316,098	11/13/2001	Yitzchaik, et al.	428	339	03/23/1999	
A65	2001/0000866	05/10/2001	Sneh, et al.	118	723 R	11/29/2000	
A66	2001/0009140	07/26/2001	Bondestam, et al.	118	725	01/25/2001	
A67	2001/0011526	08/09/2001	Doering, et al.	118	729	01/16/2001	
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B16	99/41423 A2	08/19/1999	WO	C23C	---		X
B17	96/18756 A1	06/20/1996	WO	C23C	16/08		X
OTHER ART							
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C9		Min, et al., "Atomic layer deposition of TiN thin films by sequential introduction of Ti precursor and NH <sub>3</sub> ", <i>Symp.: Advanced Interconnects and Contact Materials and Processes for Future Integrated Circuits</i> (Apr. 13-16, 1998), pp. 337-342.					
C10		Klaus, et al., "Atomic Layer Deposition of Tungsten using Sequential Surface Chemistry with a Sacrificial Stripping Reaction," <i>Thin Solid Films</i> 360 (2000), Pages 145 - 153, (Accepted Nov. 16, 1999).					
Examiner				Date Considered			
							
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	A68	2001/0031562	10/18/2001	Raaijmakers, et al.	438	770	02/22/2001	
	A69	2001/0034123	10/25/2001	Jeon, et al.	438	643	04/06/2001	
	A70							
	A71							
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	C11	Min, et al., "Metal-Organic Atomic-Layer Deposition of Titanium-Silicon-Nitride Films", <i>Applied Physics Letters</i> , American Inst. Of Physics, Vol 75(11) (Sept. 13, 1999).						
	C12	Martensson, et al., "Atomic Layer Epitaxy of Copper on Tantalum", <i>Chemical Vapor Deposition</i> , 3(1) (Feb. 1, 1997), pp. 45-50.						
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*Examiner Initial		Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate	
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	C13	Ritala, et al. "Atomic Layer Epitaxy Growth of TiN Thin Films", <i>J. Electrochem. Soc.</i> , 142(8) (Aug. 1995), pp. 2731-737.						
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	C15	Lee, "The Preparation of Titanium-Based Thin Film by CVD Using Titanium Chlorides as Precursors", <i>Chemical Vapor Deposition</i> , 5(2) (Mar. 1999), pp. 69-73.						
	C16	Martensson, et al., "Atomic Layer Epitaxy of Copper, Growth & Selectivity in the Cu (II)-2,2,6,6-Tetramethyl-3, 5-Heptanedion ATE/H2 Process", <i>J. Electrochem. Soc.</i> , 145(8) (Aug. 1998), pp. 2926-2931.						
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*Examiner Initial	Document Number	Date	Country	Class	Subclass	Translation		
						YES	NO	
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	C17	Min, et al., "Chemical Vapor Deposition of Ti-Si-N Films with Alternating Source Supply", <i>Mat., Res. Soc. Symp. Proc.</i> , Vol. 564 (Apr. 5, 1999), pp. 207-210						
	C18	Bedair, "Atomic layer epitaxy deposition processes", <i>J. Vac. Sci. Technol.</i> 12(1) (Jan/Feb 1994)						
	C19	Yamaga, et al., "Atomic layer epitaxy of ZnS by a new gas supplying system in a low-pressure metalorganic vapor phase epitaxy", <i>J. of Crystal Growth</i> 117 (1992), pp. 152-155						
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